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THE TRUE QUAGGA.

BY GRAHAM RENSHAW, M.B.

IT was said of William the Conqueror that “he loved the tall deer as though he were their father.” If this be true, then he has in these latter days been only too faithfully imitated in South Africa by Boer and by native alike; for the love which they have displayed towards the great game animals of the region between the Cape and the Zambesi has been so paternal that of the teeming millions of *Mammalia* which formerly graced veldt and karroo, but a sadly diminished remnant has escaped their devastating solicitude.

The sad list of vanished or vanishing species already includes the Blaauwbok, an Antelope whose brief history is a record of speedy extermination at the hands of the early settlers; the Bontebok (its curious and striking colouration constituting it a veritable mammalian magpie), only lingering under special protection near Cape Agulhas; the Blesbok, whose numbers to-day are but a shadow of its vast old-time legions; the White-tailed Gnu, strange apparent mixture of Buffalo and Pony, yet a true Antelope; the White Rhinoceros, huge yet harmless, a four-footed Dodo; the Mountain Zebra, whose decimated numbers seem to be likely to suffer still further reduction owing to its destruction of wire-fencing; the great Eland, once plentiful in Cape Colony itself, a lovable creature, with the meekness and even the superficial appearance of a Jersey Cow; and the South

African Giraffe, a handsomer animal than the northern species, from which it has only recently been recognised as distinct.

The regret at the loss—actual or threatened—of these fine beasts, though real enough to the naturalist, is mainly sentimental; but there remains one species whose strength, speed, and proved docility only render its total extermination at the hands of the Boer hunters a matter for deeper concern.

I refer to the handsome true Quagga of the Cape Colony and Orange Free State—*Equus quagga* of modern zoologists, *quacha* of the Hottentots, *idube* of the Kaffirs—formerly found in enormous herds on the plains south of the Vaal River, but now, in spite of all assertions to the contrary, utterly exterminated. In general proportions, and in the mane, tail, and hoofs, it was semi-equine; body-colour rufous-brown, changing to fulvous posteriorly, and fading into white on legs, tail, and abdomen. The head was striped in Zebra fashion; the neck was handsomely banded alternately with dark brown and white, these stripes fading on the withers, and becoming rapidly fainter posteriorly, the darker markings persisting on the haunches as vague lines and spots. The iris (judging from a plate which I have seen drawn from life by Waterhouse Hawkins, and depicting the pair of Quaggas formerly living in the Knowsley menagerie) was orange-brown. The mane was erect and thick; the tail reached to the hocks. Quagga foals resembled their elders in colouring, though, judging from Sparrman's remarks, these colours were probably brighter in the youngsters. Like little Zebras, young Quaggas had their coat rough and long.

The curious former association of the Quagga with Ostriches and White-tailed Gnus (exactly paralleled by the mixed herds of Burchell Zebra and Brindled Gnu) was long ago observed and commented upon by Harris. We also know that the Quagga, though fleet, could be overtaken by a well-mounted rider; that wounded animals at bay would kick savagely and bite severely; that the flesh was oily and disgusting to Europeans, though relished by the natives; and that the northern limit of the range of this species was the Vaal River. Beyond these scanty details, however, but little seems to have been recorded of the wild Quagga, and a few particulars of the animal in captivity complete all that will ever be known of this vanished equine.



When taken young the Quagga could be readily tamed ; it would also interbreed with the Horse. Sparrman, who visited the Cape towards the end of the eighteenth century, mentions that the first example of the species he met with was a sleek well-kept individual, very tame, and fond of being caressed by visitors. He also states that he saw a Quagga driven in the street harnessed with five Horses ; and advocates the domestication of the animal, urging that it could at that time be more easily obtained than the Horse, that it would naturally eat the coarse grass of the country, and would probably be immune from the horse-sickness. About 1815 Lord Morton, with the praiseworthy desire to domesticate the species, obtained a Quagga stallion ; but, being unable to procure a mate for the animal, bred from the Quagga and a mare of seven-eighths Arab blood a curious female hybrid of a dun or chestnut colour, faintly striped on neck and withers, the knees and hocks being also barred. Darwin also relates that Lord Mostyn bred a hybrid between a male Quagga and a chestnut mare. Sheriff Parkins' experiment, carried out some time previous to 1826, was of a more practical nature ; and his two beautiful Quaggas (not a pair as often stated), harnessed to a phaeton, were frequently to be seen in Hyde Park and other fashionable places. Like other Society beauties, one of these Quaggas had his portrait painted ; this work, by Agasse, still hangs in the Royal College of Surgeons, Lincoln's Inn Fields, where I have recently inspected it ; and the woodcut illustrating the article "Quagga," by the late Sir W. H. Flower, in the 'Encyclopædia Britannica,' is taken from this painting. Many years later Lieut.-Col. C. Hamilton Smith drove a Quagga in a gig. He seems to have been well pleased with it, and states that its mouth was fully as delicate as that of a Horse.

Let us now trace the history of the true Quagga from the sunny days of its prosperity to its decline and fall. For centuries it had thronged the veldt, its numbers unthinned by the hunter's rifle, and but little affected by the primitive weapons of the natives. When the Cape was opened up by the early settlers it gave way but slowly at first : we may note, however, that in 1820 Thomas Pringle, the South African poet, and the friend of Sir Walter Scott, observes that the Quaggas and Hartebeests had

already almost totally disappeared from the open pastures of the Albany district of Cape Colony, to which they had formerly given life and interest. This may be taken as the first definite mention of the retreat of the true Quagga before advancing civilization—a merely natural though regrettable result of the progress of the white man. When Captain (afterwards Sir) W. Cornwallis Harris, in 1836, penetrated into the far interior, he found the true Quagga abundant on the plains south of the Vaal, whilst north of that river it was replaced by the equally plentiful Burchell Zebra; and, indeed, the exuberant profusion of other great game was on a similar scale, for the spreading veldt was alive with Eland and Gnu, Rhinoceros and Springbok; whilst the glittering salt-pans bloomed with purple masses of Blesbok and Bontebok. We can only in these days see in imagination what Harris saw in reality; yet we can picture the Quaggas in the days of prosperity, feeding in a huge crescent, occasionally emitting a barking neigh, their striped heads turning this way and that, and their snowy tails whisking in the blazing sunshine. Harris, however, tells us that even in his day these animals had disappeared from many places in the Colony where they had formerly abounded, although in the wild interior they still existed in immense herds. The species, though rarer, was yet very far from being extinct. About 1850, however, the Boer hunters appeared. Shooting neither for food nor for legitimate sport, but for hides alone, they attacked without pity the noble game animals which had delighted Harris and many others with their abundance and variety, and ruin fell everywhere on the denizens of this sportsman's paradise. The game at first appeared to defy all efforts to reduce its numbers, but so persistently was the massacre carried on by the hide-hunters in season and out of season, no close-time being allowed, that at last it began to vanish rapidly, and upon the true Quagga, with its now fearfully diminished range south of the Vaal, this persecution fell with double force. These unfortunate animals were exterminated in Cape Colony about 1865, according to Mr. H. A. Bryden; those in the Free State lived a few years longer, though Mr. Buckley's expedition in 1873 already found the animal "apparently unknown." At any rate, as a stuffed specimen was acquired by the Edinburgh Museum of Science and Art as late as

1879, we may perhaps compute that the animals in the Free State may have struggled on for about ten years longer at least than those in the Colony. Like the American Bison, the Quagga was so rapidly exterminated that its loss was never suspected until too late to prevent it; whilst the erroneous name "Quagga" (still employed by those who should know better), being conferred on both species of Zebra in South Africa, encouraged the belief that the true owners of the name had not been lost after all. Again and again one reads that "the rare animal the Quagga" has again turned up, but when the Sea-serpent has been captured one may believe in Quagga stories also; for all these cases, when investigated by competent persons, turn out to refer to Zebras. The true Quagga is gone for ever. *Requiescat in pace!*

When an animal becomes extinct, Science mournfully treasures up the records of its existence, and enumerates with dismal care the poor remnants of skin and bone (*literally*, skin and bone) that may exist, a poor exchange for the life of a fine species. The Great Auk has its historians; the Labrador Ducks, a silent nation, lie in stuffed stillness, redolent of naphthaline, in the drawers of a few known cabinets. Similarly I have thought it might be valuable to brother zoologists if I collected a list of all specimens, living and dead, which have represented *Equus quagga*, either alive in Zoological Gardens, or as prepared specimens in Zoological Museums.

After immense labour and correspondence, it appears that the following Quagga have figured amongst the attractions of European menageries:—

(1) The Windsor Quagga, imported into England during the eighteenth century, and kept at Windsor as the property of the then Prince of Wales.

(2) The late Prof. Alphonse Milne-Edwards informed me, only a month before his lamented death, that the famous Jardin des Plantes at Paris had once possessed a Quagga, which lived to eighteen or twenty years of age in the menagerie. It was described by Cuvier in 1821.

(3, 4) A pair of Quagga formed one of the varied attractions of the great Knovsley menagerie. On the death of Lord Derby in 1851 the menagerie was sold, and the female Quagga purchased for the Amsterdam Zoological Gardens. Some time afterwards

this animal gave birth to a curious hybrid, the father of which was an Asiatic Wild Ass (*Equus hemionus*).

(5, 6, 7) Three Quaggas (not two as I have seen stated) have been exhibited by the Zoological Society of London—(a) an animal which died fully adult, as I judge from examining the skull, some time previous to 1838 (skin and skeleton mentioned in Waterhouse's old catalogue); (b) a female purchased in 1851; (c) a male, presented by Sir George Grey in 1858. This animal was photographed alive in 1872, when its wild brethren were already in the throes of extermination.

(8) A Quagga was formerly exhibited alive at the Berlin Zoological Gardens; its skin and skeleton are now in the Museum für Naturkunde.

(9, 10, 11?) "Several" Quaggas were obtained about 1870 by the Belgian consul at Port Elizabeth, and sent to the Antwerp Zoological Gardens.

No Quagga foals have ever been born in captivity. After careful inquiry, I learn that this species has never been exhibited in the Zoological Gardens of Bristol, Cologne, Dublin, Frankfort-on-Main, Hamburg, Hanover, Lisbon, Marseilles, or Rotterdam. Thus ends the brief record of the living animal, which has passed away for ever, with all its latent qualities for domestication unused, and even its habits but imperfectly known.

To turn to the last portion of this essay: the census of known remains—a melancholy inventory at best. In 1898 I contributed a short article to 'The Zoologist' on "Existing Specimens of *Equus quagga*," giving only a very short list, and suggesting that somebody should take the matter up, and compile a complete census of relics, little thinking that one day I should myself essay the task. The results of a laborious undertaking are here summarised; and I hasten to express my thanks to all those scientific gentlemen who in Europe, South Africa, and the United States have so kindly aided me with information. The census is as follows:—

The United Kingdom.—(1) The newly-mounted old skin of the first Quagga possessed by the Zoological Society of London now stands in the Mammal Gallery of the Natural History Museum at South Kensington. It seems probable that this is the identical skin which Harris figures at the end of the article "Quagga,"

in his famous 'Portraits of the Game and Wild Animals of Southern Africa.' The skull and skeleton of the same individual are also in the National Collection.

(2) The Royal College of Surgeons Museum contains the skulls of the two Quagga stallions once driven by Sheriff Parkins. I have examined both specimens; they belonged apparently to animals in the prime of life.

(3) The Tring Museum possesses a beautiful Quagga mare; the markings are particularly distinct.

(4) The Science and Art Museum at Edinburgh has a stuffed Quagga (sex unknown) amongst its zoological treasures.

(5) The Yorkshire Philosophical Society's Museum (York) contains an equine skeleton alleged to belong to this species. On inquiry, unfortunately, I found that no data were obtainable.

(6) I have examined an equine skeleton in the Medical Museum of the Owens College, Manchester; it is said to be that of a true Quagga, an opinion in which I concur, as the skeleton has a squarish diastema and stout nasal bones, unlike the oblong diastema and elongated nasals which I have found to characterise the skull of the "Quagga" of modern hunters, *i. e.* Burchell's Zebra.

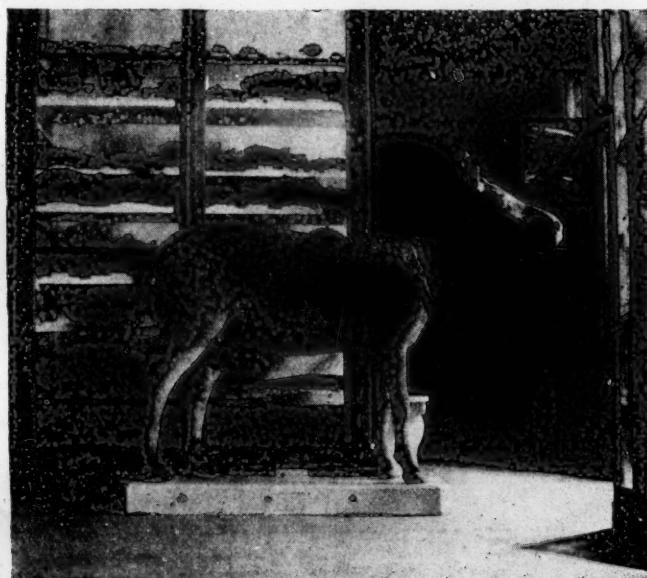
United States.—I am informed that the Academy of Natural Sciences at Philadelphia possesses a roughly cleaned skeleton of *Equus quagga*, presented by the late Prof. Cope. No data are to hand, unfortunately.

Continent of Europe.—(1) I have three times examined the stuffed Quagga stallion in the Natural History Museum of the Jardin des Plantes, Paris. It is evidently of great age, and the late Prof. A. Milne-Edwards suggested that it may have been brought home by Perron and Leseur. The taxidermist has provided it with old-fashioned glass eyes, thus giving to an herbivorous animal the circular iris of a cat! In the same museum-case is preserved the type-specimen of Grevy's Zebra (*Equus grevyi*).

(2) The Natural History Museum at Leyden is celebrated for many rarities; it not only has the priceless treasure of a real mounted Blaauwbok, and also a stuffed White Rhinoceros, but in addition possesses a Quagga stallion, and also the perfect skeleton of the animal; all these rare specimens, by the kindness

of the Museum authorities, I have recently been enabled to photograph.

(3) The Quagga formerly at Knowsley is now preserved at Amsterdam, splendidly stuffed and mounted (the glass eyes are actually of the same colour as figured in Waterhouse Hawkins's coloured plate of the living animal). I had in May last the opportunity of examining and photographing this, perhaps the finest example in existence, as it stood in the Museum of the Amsterdam Zoological Society.



Quagga Stallion in the Natural History Museum at Leyden.

(4) I am informed that the great Zoological Museum at Turin contains a stuffed Quagga and its skull, obtained at the Cape in 1827.

(5) I saw a stuffed Quagga in the Natural History Museum at Berne in 1895. It is to be regretted that this valuable specimen is not protected by glass from dust and injury.

(6) Dr. Möbius kindly informs me that the Berlin Museum possesses not only the stuffed skin and skeleton of the Quagga formerly living in the German capital, but also a skeleton received in exchange, and two skulls.

(7) A stuffed Quagga and skull is preserved at Munich.
(8) There is another stuffed example at Mainz.
(9) The Director of the Senckenbergian Museum at Frankfort-on-Main kindly informs me that the collection includes a stuffed Quagga and its cranium, obtained in South Africa in 1831.
(10) Dr. Steindachner informs me that the Vienna Natural History Museum has a good stuffed example of *Equus quagga*, but no skeleton.
(11) Stockholm. Great interest attaches to the little Stockholm specimen. It appears to be the *only foetal specimen* in existence, and is more than a century old, having been brought home by Sparrman himself. It is thus the most venerable relic of the Quagga in existence. From a photograph very kindly forwarded by Mr. F. A. Smith, it appears that the coloration is much as in the adult.

South Africa.—After repeated inquiries it appears that the only specimen preserved in all South Africa (the former home of the species, where its teeming numbers flourished so abundantly in the old days) is in the Capetown Museum! Mr. W. L. Slater has very kindly forwarded me a photograph of this Quagga, and informs me that it was presented to the Museum by Mr. A. Dale, of Beaufort West, previous to 1862. As Sparrman's Quagga is the *only foetus*, so it appears that the Capetown Quagga is the *only foal* in existence. The rough coat of the young animal is well shown in the photograph.

This completes the census. After much correspondence I learn that there are no specimens of *Equus quagga* in the Museums of Aberdeen, Brussels, Breslau, Chicago, Copenhagen, Dresden, Dublin, Durban, Florence, Geneva, Grahamstown, Hamburg, New York, Oxford, Prague, Pretoria, Pietermaritzburg, and Washington. The so-called Quagga at Bristol is only *Equus burchellii*.

Amongst the natural history specimens sold at Stevens's Rooms on Aug. 22nd, 1899, was "Lot 240. Skin of Quagga, now extinct." I have been unable to authenticate or trace this specimen.

And so the curtain rings down on *Equus quagga*, one of the finest, most interesting, and most docile of the fast vanishing African fauna—a species which might have been of great value in

a continent infested by the Tsetse Fly, and cursed with the horse-sickness ; massacred and exterminated for the miserable value of its hide by the very people it was so well fitted to benefit ! The list of dying species grows apace : Blaauwbok ; true Quagga ; next the White Rhinoceros ; then Bontebok, Blesbok, White-tailed Gnu, Mountain Zebra, Unstriped Eland, Southern Giraffe, Elephant.

Di avertite omen !

OBSERVATIONS ON THE NOCTULE.

By CHARLES OLDHAM.

IN the neighbourhood of Alderley Edge, and, indeed, throughout the wooded parts of the Cheshire Plain, the Noctule, *Pipistrellus noctula* (Schreb.), is abundant. A hollow tree, or less frequently a house-roof, serves as a diurnal retreat, whence, during the warmer months, the Bats issue to feed soon after the daylight has begun to wane. On fine summer evenings one's attention is often attracted by the shrill squeak of the Noctules which are flying in company with the Swifts, at an altitude difficult to estimate accurately, but certainly not less than from seventy to eighty feet. This squeaking note is pitched so high that it is inaudible to many ears. As the light fades, the Bats descend to a lower level, and feed at a height of from fifteen to thirty or forty feet above the fields, pools, and open places in the woods. The crunching of their jaws as they masticate their insect prey may then be heard distinctly.

The time at which the Noctule issues from its retreat does not always bear the same relation to the hour of sunset, and sometimes differs considerably on consecutive evenings. Wind, temperature, and other atmospheric conditions, rather than the actual hour of sunset, probably determine the time at which the Bats emerge, and the duration of their flight. Rain, if not heavy, does not incommodate them whilst feeding, but if the night be cold and windy few or none will be seen. It is probable that individual Noctules do not always resort to the same den throughout the summer, for the numbers which emerge in the evening are not constant, and even on consecutive evenings, when the atmospheric conditions appear to be identical, the number sometimes varies considerably. On the other hand, it is possible that on some evenings the whole strength of the colony does not turn out, and that some of the Bats remain in the den all night.

On April 5th, 1896, Mr. T. A. Coward and I watched Noctules sallying forth for their evening flight from a hole beneath the

eaves of the church at Nantglyn, Denbighshire.* The first, which emerged at 7.15, was followed at short intervals by seven others, and at 7.27 between twenty and thirty appeared in quick succession. On several evenings in the spring of 1900 I timed the Noctules as they left their den in the dead limb of a beech at Alderley Edge, and later in the year I made some observations on a second colony which had its quarters in the hollow trunk of a living Scotch fir in the same district. The results are summarised in the following table:—

Colony in Fir.	Colony in Beech.	Date.	Sunset at Greenwich.	Approximate time of sunset at Alderley Edge.	Number of Bats.	Time of Appearance.	Time at which first Bat entered hole on return.
April		18th	6.58	7.11	10	7.37-7.40	—
		21st	7.4	7.17	4	7.45-7.46	—
		26th	Windy and cold. I watched from 7.35-8.20. No Bats appeared, although they were squeaking in the den.				
May		3rd	Windy and very cold. Bats again squeaking, but none emerged between 7.45 and 8.20.				
		4th	7.25	7.40	20	7.58-8.4	—
		6th	7.28	7.43	15	7.58-8.0	—
August		5th	7.40	7.56	9	8.12-8.13	—
		10th	7.32	7.47	9	7.58-8.3	9.5
		12th	7.28	7.43	4	7.50-7.59	9.7
		13th	7.26	7.41	2	7.46-7.49	—
		14th	7.24	7.39	6	7.32-7.44	—
		15th	I caught three Bats—all females—as they emerged this evening.				
September		23rd	7.6	7.20	5	7.29-7.31	—
		27th	6.57	7.10	22	7.29-7.30	8.24
		30th	6.51	7.4	19	7.2-7.8	8.41
		31st	6.48	7.1	16	6.55-7.4	—
		3rd	6.42	6.54	27	7.7-7.11	8.22
		4th	6.40	6.52	24	6.56-7.1	7.53
		5th	6.37	6.49	27	6.59-7.4	7.58
		7th	6.33	6.44	17	6.48-6.51	—
		9th	6.28	6.39	18	6.53-6.56	7.54
		17th	6.10	6.20	6	6.28-6.29	—
		29th	5.42	5.42	17	6.6-6.8	—

* The Noctule, although probably common and generally distributed, has been recorded from but few Welsh localities. Mr. G. H. Caton-Haigh states that it is common in Merionethshire (Zool. 1887, p. 293). In May,

The time at which the first Bat issued from the hole varied from twenty-eight minutes after sunset, on April 21st, to seven minutes before sunset, on Aug. 14th. The Bats leave the den in rapid succession—on Aug. 27th twenty-two emerged within a minute—but their return is much less regular. This is probably due to the varied success of individuals in obtaining food. During August and September, at any rate, on fine still evenings, the duration of the vespertinal flight is sometimes less than an hour; on Aug. 27th a Bat entered the den fifty-five minutes, and on Sept. 4th fifty-seven minutes, after the first had emerged. On each evening, however, the flight in some cases lasted at least an hour and a half; and on Sept. 5th some of the Bats were absent for more than two hours. It is probable that on wet and windy evenings the duration of the flight is even less than an hour, but I have no data to prove this. It is easy to count the Bats as they leave their den in the twilight, but a difficult matter to make sure of the number that return. They do not often enter the hole immediately on their arrival, but dash round and among the trees, and in many cases pitch several times for an instant on the tree-trunk near the hole. Their advent is proclaimed by the beating of their wings, but even on moonlight nights all that one sees is a form silhouetted for an instant against a patch of sky. When the Bat is flying against a background of tree-trunks or foliage one can see nothing. It is true that a faint rustle may be heard when a Bat actually enters the hole, but this resembles the noise made when it pitches for an instant on the tree-trunk, and if two or more Bats arrive together, as often happens, the confusion is increased. A good deal of intermittent squeaking may be heard in the den after the arrival of the second Bat. The following extracts from my note-book describe the course of events on three evenings:—

Sept. 3rd.—Fine moonlight evening; no wind. First Bat emerged at 7.7, followed by twenty-six others before 7.11. Much squeaking for half an hour before they appeared. None seen or heard until 8.22, when one returned and entered the hole, after

1898, I saw several flying above the Beaver's Pool, on the Conway, near Bettws-y-Coed. In August, 1895, Mr. T. A. Coward saw many at Nevin, Carnarvonshire. The Bats, which were flying low over the fields at the edge of the cliffs, appeared to be feeding on the winged males of a black ant.

pitching for an instant and dashing away again eight times. Others kept dropping in until 9.38, when I left. At 8.49 three or four were dashing round the tree at once. Intermittent squeaking in the den as the Bats returned.

Sept. 4th.—Fine moonlight evening; no wind. The first Bat was out at 6.56. Twenty-three more followed before 7.1. No further sign of Bats until 7.53, when one arrived; two others at 7.59. From then until 8.30 many came. Twice in that time there were three or four at once. On the whole the Bats returned much earlier than last night, although there was no apparent difference in the atmospheric conditions.

Sept. 5th.—Another fine still evening; moonlight. Twenty-seven Bats left the den between 6.59 and 7.4. The first returned at 7.58, the second at 8.4. From then until 8.50 many returned, singly and by twos and threes. Others put in an appearance until 9.20, when I left, but there was a marked falling off in the frequency of the arrivals during the last half-hour.

It may be that the period of activity is not limited to a short vespertinal flight of from one to two hours, and that the Bats leave their den again before daylight; but I do not think so, and for this reason. A captive Noctule which I had for some weeks during the summer used to wake up between 7 and 8 o'clock in the evening, and become very active, climbing about the box in which it was confined, and squeaking vigorously. When, as sometimes happened, I was unable to feed it until two or three hours later, it relapsed into the lethargic sleep which characterizes Bats in the daytime, and I had to rouse it again by warming it in my hand.

Noctules scuffle and squeak for half an hour or more before leaving their dens in the evening, and this squeaking may be heard sometimes even at midday. In Alderley Park, at noon on July 15th, Bats, presumably of this species, were squeaking in a Woodpecker's hole in a tall beech, and during the morning of Aug. 5th the noise made by the Bats in the hollow Scotch fir on the Edge was very noticeable.

This species changes its feeding-grounds at different times of the year. For some weeks about midsummer Noctules may be counted by scores on almost any evening along the road which skirts the foot of Alderley Edge on the north, but in spring and

late summer the Bats will be sought in vain at this place.* Their presence or absence is no doubt determined by the distribution of the insects upon which they feed.

From the beech, whence I had watched the Noctules fly early in May, I obtained nineteen on the 8th of that month. Their den was in a hollow limb about forty feet from the ground. The cavity, between two and three feet in length, was dry and warm in its upper part, and impervious to wind and rain, whilst near the lower end egress was possible by several crevices and an old Woodpecker's hole. At 7.15, some three-quarters of an hour before their time of flight, the jarring of a ladder against the tree caused some of the Bats to squeak. When I broke away the dead wood, however, and exposed them to the daylight, they made no attempt to escape, but remained huddled together in a comatose condition in the upper part of the cavity, their low temperature during sleep being apparent when I handled them. As I detached them from the sides of their den, to which they clung tenaciously with their feet, hanging head downwards, one wakened sufficiently to escape. The others, placed in a linen bag, were transformed in a minute or two from cold inert creatures to a hot struggling mass. Of the nineteen Bats secured, all but three were males. The majority were liberated at once, and took wing with ease from the flat surface on which they were placed. I retained a couple, as did my friends Messrs. T. A. Coward and F. S. Graves, and we were thus able to check one another's observations on the actions of the Bats in captivity. This species takes kindly to confinement; one of the Bats, an old female, and the principal subject of the following notes, was at the end of eleven weeks in perfect health and condition. Of the other captives, one was accidentally poisoned, and four were released after a few days.

The Noctule, like other Bats in captivity, shows little inclination for flight, especially in an artificially lighted room, and, when it does take wing, frequently collides with the walls and furniture. A confined space is indeed unsuited to its bold and dashing flight, although in a darkened room it will remain on the wing for some time and avoid accidents. In walking—a captive Bat's usual mode of progression—the body is carried clear of the

* Cf. 'Zoologist,' 1895, p. 167.

ground, and supported on the feet and wrists only. The tail is curved downwards and forwards, and the interfemoral membrane pressed against the belly. The fore limb is spread considerably, but the phalanges with their connecting wing-membrane are tightly closed and folded back along the lower arm. In ascending a curtain or picture-frame, the claws on the thumbs are brought into use, and the tail, instead of being curved beneath the body, is then extended backwards, with the tip pressed closely against the surface of the object up which the Bat is climbing. For the time being it is analogous to the stiffened retrices of a Wood-pecker or Tree-Creeper.

Any instinctive dread which Bats may have of man disappears quickly in captivity, but the Noctule is exceptionally fearless. Within a few minutes of their capture, I took two of the Bats singly from among their struggling fellows in the bag, and, holding them in one hand, offered mealworms with the other. So cramped were they that they could not move their limbs, but they seized and devoured the insects with the utmost *sang froid*. On the same evening others were climbing about my arms and neck without any signs of fear; and the old female which I had for several weeks used habitually to clamber up my arm as it rested on the table, and snuggle against my neck.

Before settling down to sleep after it has fed, the Noctule, like other Bats, goes through a somewhat elaborate toilet. The wings and interfemoral membrane are thoroughly cleansed by licking, and the fur of the whole of the body is scrupulously combed, the sharp claws of the toes being well suited for the purpose. During the process the Bat frequently sucks its toes, the moisture serving doubtless to keep the beautiful golden fur sleek and clean. No one who has watched a Bat clean itself, as it hangs suspended first by one foot and then the other, can fail to be struck by the creature's suppleness and agility.

In another respect this species resembles all the Bats I have kept in captivity. It never attempts to pick up food which it has accidentally dropped. It is true that when running about the table a Bat may encounter a half-eaten moth or mealworm, which it will seize and devour, but this is tantamount to finding a fresh insect altogether. If, however, a fragment of beef or a decapitated moth is dropped, and lies on the table immediately beneath

the Bat's nose, or if a partially devoured mealworm succeeds, by dint of its convulsive struggles, in escaping from the Bat's jaws, and instinctively makes for the darkness beneath its body or wings, the Bat makes no attempt to recover it. It usually turns its head from side to side, and then runs forward on the look-out for fresh prey. This failure to recover, or even search for, food which has been dropped is not due to any distaste on the Bat's part, for it will seize and devour the lost prey if it be proffered again. It seems to arise from the absence of any conception that food once dropped can be found again, and no doubt implies that Bats obtain, and have for an infinite number of generations obtained, all their food whilst on the wing. Even if this be so, it is still very curious that a Bat should be able to adapt itself at once to entirely new conditions, and take food readily whilst held in the hand, and yet after a captivity of nearly three months should persistently ignore palatable food which it has dropped, and which lies immediately beneath it.

Bats drink frequently. My captive Noctules sometimes lapped water from a saucer which stood on the table, but generally took the liquid from a camel's-hair pencil, either by lapping, or by taking the brush into their mouths and sucking it. Their food consisted of mealworms (the larvae of a beetle, *Tenebrio molitor*), raw lean beef, and such moths, beetles, and other insects as I was able to procure. All food was thoroughly masticated by an extremely rapid movement of the jaws before it was swallowed. The wings of moths were generally consumed, but the horny elytra of large beetles were bitten off and allowed to fall as the insect disappeared in the Bat's mouth. Mealworms and small moths, as well as *Cicindela campestris*, and beetles of lesser size, were seized and eaten without any attempt to overcome their struggles. On the other hand, large moths, such as *Xylophasia polyodon* and *Phlogophora meticulosa*, were sometimes, and the powerful beetles *Geotrupes stercorarius* and *Melolontha vulgaris* always, thrust by the Bat into the pouch formed by the interfemoral membrane, in order to secure them effectually before they were eaten.* A Cricket (*Acheta domesticus*) offered to one of Mr. Coward's Bats was treated in this way, but Cockroaches (*Blatta orientalis*) were in some instances thrust

* For a description of this habit, see 'Zoologist,' 1899, pp. 471-474.

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into the pouch, and in others eaten without that preliminary. It should be remarked, however, that Cockroaches, despite their size, submitted very tamely to their fate. On no occasion was foot, carpus, or thumb used to secure or dismember prey.

The insects eaten by any creature in captivity cannot be taken as a criterion of its food in a free state, but it may be worth while to note that, in addition to the moths already mentioned, the following, among others, were readily taken by the Bats:—*Mamestra persicarie*, *Leucania pallens*, *Hepialus humuli*, *H. sylvinus*, *H. hectus*, *Rumia crataegata*, *Urapteryx sambucata*, *Odontopera bidentata*, *Fidonia atomaria*, *F. piniaria*, and *Amphidasis betularia*. The Bats appeared to be unable to see food if held but little more than an inch in front of them, and this was the case in natural twilight, as well as in an artificially lighted room. It is therefore very doubtful whether, in a free state, they would avoid a distasteful moth because its nauseous properties were advertised by its warning colours.

That certain insects were distasteful was clearly shown by the behaviour of one of the Bats. It seized a moth (*Euchelia jacobææ*) from my fingers, but dropped it immediately, shaking its head from side to side in evident disgust. Taking the moth in my fingers, I offered it again to the Bat, which declined to touch it. I then held the moth with a pair of forceps, which I generally used in feeding the Bats, as being less susceptible to their sharp teeth than were my finger-tips, and which were intimately associated with food in their minds. The moth was seized at once, but dropped immediately with repeated signs of disgust, and I could not induce the Bat to take it a third time. On the two following evenings I offered it other moths of the same species, doing so before I gave it other food, in order to make sure that it was hungry, but it would not touch them, although it sniffed at them, and probably recalled their nauseous qualities by its sense of smell. On another occasion an example of *Abraæas grossulariata* was seized twice, and then dropped with every appearance of disgust, and I could not get the Bat to touch it again.

Two other moths (*Spilosoma menthastræ* and *S. lubricipeda*) appear to be unpalatable, but in a lesser degree. The first time I offered the Bat a *menthastræ*, it seized and ate it without

evincing any distaste; but on the next day it dropped another moth of the same species immediately, and then treated a *lubricipeda* in the same fashion, although it was hungry at the time. On the following evening I again tried the Bat with a *menthastris*, but without success. Three days later, however, I induced it to eat single moths of both species, but it dropped them several times, and only ate them eventually after a good deal of pressure. From that time the Bat overcame its distaste for these moths in a large measure, for on a subsequent occasion it ate seven *menthastris* and two *lubricipeda* with apparent enjoyment, but refused a tenth moth, although it was still hungry, and eagerly seized and ate several mealworms and flies.

Both of Mr. Coward's Bats persistently refused to touch an Oil Beetle (*Meloë* sp.) which he offered to them.

THE GRASSHOPPER-WARBLER (*LOCUSTELLA NÆVIA*) IN NORTH WORCESTERSHIRE.

By H. ELIOT HOWARD.

VERY few birds interest me as much, I might almost say none more, than the Grasshopper-Warbler, and the following notes are the result of many years' observation in this county. Probably, owing to the habits of birds varying so widely in different districts, these notes will not be found to agree entirely with the experiences of other naturalists who have studied this Warbler in different parts of the British Islands to myself.

The dates of arrival in this county for the last four years (leaving out 1898, when I was absent) are as follows: 1896, April 19th; 1897, April 23rd; 1899, April 20th; 1900, April 19th. It is certainly much more regular in its time of arrival than the other summer migrants, the dates, as will be seen, varying very little. No matter what the weather is when it first arrives, its note is sure to be heard in the morning—cold, frost, or rain seeming to have very little effect in preventing it singing. As a rule, they will be found at once in the spot where they intend to breed, but I have sometimes found them for the first few mornings after they arrive in hedges by the side of a road. One which I especially noticed last year was singing in a hedge which was absolutely bare, and opposite to which was a farmyard; but they all pass on in a day or two to more suitable breeding haunts.

There are certain places where I can always be sure of finding one or two pairs, and these are for the most part osier-beds which have been cut down two or three years previously. The osiers are then about four feet high, intermingled with hazel, and with very thick undergrowth. These sort of places they seem to prefer for breeding purposes more than any other; but I have found them fairly plentiful in large woods, where the undergrowth is very thick, but in almost every instance there has been water

somewhere near. A few breed in thick hedges, and it was in one of these that I found the only pair breeding away from water of some kind that I have ever found. This was in 1897, when a pair bred in a thick hedge next to a field of corn. They are plentiful enough in this county—you might almost call them common—but, on account of their shy and retiring habits, they are little known and easily passed over.

In the number of arrivals there is great variation—more, I think, than with any of the other migrants; and, if they are plentiful one year, and the young are successfully reared, I have as often as not found that they come in exceptionally few numbers the next year. The year 1897 I remember well, as they visited us in greater numbers than usual. In one osier-bed, about a quarter of a mile long, I found six different pairs; the next year, in the same osier-bed, only one pair, although the conditions appeared to be just the same. In order to see the Grasshopper-Warbler at its best you must watch it for the first few hours after dawn—and indeed this may be said of all birds during the summer months; but at no time is *Locustella nævia* so lively as during the first two hours of daylight, and at no time of the year is it so amusing as during the last week in April and the first week in May. It is then that the females arrive, and they begin to mate. It will repay anyone to sit still for an hour or two at dawn to watch them. The female then walks along amongst the undergrowth, threading her way in and out, sometimes pecking or pretending to peck at something; the male follows a few feet behind, at times picking up a dead leaf in his bill, and carrying it for some distance while following the female, apparently with no object, unless it is a gentle reminder to her that he wishes to commence nesting operations. These operations are generally disturbed by the appearance of another male on the scene, and at once they set to and chase one another, now and then in their excitement settling on a bush and singing for a few seconds; the flight when this goes on is, as a rule, very rapid, and it is not long before he returns to the female and again commences to walk after her, varying the operation at times by crawling up to the top of a bush and commencing to sing.

Directly they are paired they commence nesting operations, the male at this time singing a great deal in the mornings, some-

times on the top of a bush, sometimes low down. When the sun first rises they are fond of sitting on dead branches in order to preen their feathers. If when at the top of a bush he happens to see you, he dives down into the middle and disappears immediately, only to reappear presently, if there is nothing to alarm him, crawling up the middle of the bush and walking along the branches until he gets back to his original perch, when he will again commence to sing. The habit they have of crawling up the bushes is so like that of a Field-Mouse, that I have more than once mistaken the one for the other, the Field-Mouse also being very fond of creeping up the stem of bushes.

The female seems to be more fond of walking along the ground than the male, and when disturbed off her nest slips quietly down amongst the thick undergrowth that generally surrounds the nest, shortly to return providing there is no noise or movement to frighten her.

I have never heard the female utter a note of any kind, though I have many times watched both when mating, and when the young were hatched. She is more difficult to watch than the male, on account of her habit of creeping along the ground; in fact, the only times I have seen the females at all lively is for the first hour after dawn during May and June. At that time the male and female chase one another, and I have seen the female when tired of this sitting quietly on a dead branch of a nut bush, but by sunrise she was off back to her nest. The male in this county sings at most hours of the day and night until the female begins to sit, when he is almost silent, and remains so till the young are out of the nest, then he commences to sing again—that is to say, from the middle of May till about the third week in June.

This habit is curious—in no other bird have I noticed it—and I should be interested to know if others have observed the same thing. I said almost silent, because I once heard one singing very quietly on a hot afternoon early in June. From the time he arrives till the middle of May he sings continuously in the morning, and certainly at times he is very hard to locate, owing to his note sounding farther off than it really is, and *vice versa*, the result of a habit he has of turning his head from side to side when singing. He is also fond of singing at night; but I cannot

say I have ever heard him in the middle of the day, although I have early in the afternoon.

The nests I have found are few, and I remember the first one was by consequence of luck—or rather ill-luck—for I trod on it. It was in the middle of some bent, practically on the ground, and this is the spot they seem to be most fond of for breeding purposes. One very pretty nest I came across about three years ago was between two and three feet from the ground, amongst a lot of long dead grass; the nest itself was built entirely of the same grass, but this is the only one I have found so far off the ground.

The young leave the nest soon after they are hatched. Whether or not two broods are reared here in the year I cannot say, never having found a second one; but the old birds sing during most of July, so probably, in some cases, two broods are reared.

The earliest date at which I have found the young hatched is June 6th, but that was exceptional. In September the young males make an attempt at singing, but it only results in a curious crackling noise; they are certainly more easily approached than the old birds, and at this time of the year I have often seen them basking in the sun on dead branches, when they will allow a very near approach before disappearing into the bushes with that curious habit they possess of flirting their tail.

DISTRIBUTION OF THE STONECHAT (*PRATINCOLA RUBICOLA*) IN YORKSHIRE.

By E. P. BUTTERFIELD.

A DETAILED account of the county of broad acres in this article would be out of place, suffice it to say that Yorkshire is the largest, and, with Lancashire, the most southern of the six northern counties of England, nearly through the centre of which runs the parallel of 54° north latitude, and contains 6095 square miles, or about 3,882,000 acres, and is divided into three Ridings, North, West, and East. The North Riding includes that portion of the county between the river Derwent and the county of Durham, the West Riding being separated therefrom by the Ouse, Ure, and the hills above Wharfedale; whilst the East Riding occupies the south-eastern portion of the county, and is divided by the Ouse from the West, and the river Derwent from the North Riding. One of the most striking physical features of the shire is the great central vale of York, which is narrow and somewhat elevated in the north, but as it approaches the Humber widens out into a large and swampy flat. East and west of this valley is enclosed by tracts of considerable elevation, which in the former terminates in the north in bleak moorlands, which attain a height of over 1000 ft.; in the latter the ground gradually increases in height until it ultimately forms part of the Pennine chain, which in Yorkshire attains some of its highest elevations on Whernside (2414 ft.), Penyghent (2273 ft.), Ingleborough (2373 ft.), and Dent Crag (2253 ft.), whose eastern sides give rise to the waters of the Wharfe, Aire, Nidd, tributaries of the Ouse, which flows into the Humber, the latter of which receives nearly all the drainage of the whole county; the exceptional portions of the county not drained by the Humber being a small portion of the west, which is drained by the Ribble, the north by the Tees, and the east directly by the German Ocean. The elevated tracts of the south of the east of the vale

of York, here called wolds, do not reach to the coast, but form, where the Yorkshire water system combines to form the Humber, a large alluvial tract of country known as the Holderness.

The geology of the county is of a varied character; the limestones and shales form the mountain masses in the north-west, and are succeeded in the south-east by the millstone grit formation; whilst west and south-west of the central vale the carboniferous system attains its maximum development. In the west the Silurian occasionally crops up, and a belt of lias skirts the coast south of Whitby, and after a very circuitous course comes into contact with the chalk near Market Weighton. As might be expected from such a diversity of physical conditions, the climate varies greatly, being dry and bleak in the east, comparatively mild in the central vale; whilst the elevated portions of the west and north-west are marked by a tolerably healthy climate, but are swept by high winds, and have a heavy rainfall. This is well shown by the fact that while the mean annual rainfall of the east is 26 inches, that of the west is 36·44 inches. This heavy rainfall in the West Riding is probably due to the land there being aggregated in mountain masses, and as the prevalent winds are from the west and south-west, they come laden with aqueous vapour, which, on coming into contact with the high ground, is precipitated as rain. This excessive rainfall and low temperature may account to some extent for the absence or extreme scarcity of a few of our summer migrants in the north-west fells.

The Stonechat in Yorkshire used to be regarded as "common and generally distributed in suitable localities"; but, if so once, is so no longer, and is now both local and scarce, and very erratic in its distribution. It is, however, highly probable, if not certain, that formerly it was commoner than at present, at least in the north-western portion of the county, and it is to be feared that, as a *breeding species*, it is dying out. In this district (Wilsden) I am not aware of its having bred for over thirty years, which is very strange, as gorse is quite common on the waste lands, and flourishes up to 1000 ft.

An old friend once told me that he found what he took to be the nest of the Stonechat near here, which must be forty if not fifty years ago. This instance, and another recorded by Mr.

Ellison, of Steeton, which he found some years ago near Keighley, are the only records I know of the breeding of the Stonechat in Upper Airedale. Further north-west, Mr. Peake, in his list of Settle birds, knows but one instance of its nesting in that district (1896); whilst for the Sedbergh district, the extreme north-west, Mr. Richardson states that there is no satisfactory record; and it is marked as of doubtful occurrence for Langstrothdale (mid-west). Messrs. Clarke and Roebuck omit it from the list of birds for Washburndale, but it is included in their list for Nidderdale as rare, but unfortunately not stated whether it breeds, and Mr. Lucas omits it altogether from his list of birds of this dale. Mr. Thomasson informs me, quoting from Mr. Backhouse's 'Guide to Upper Teesdale,' that it does not occur in Upper Teesdale; but, curious to say, it breeds, and not uncommonly, in Weardale, the next valley to the north. Mr. Jas. Carter includes it amongst the rarer birds of Leyburn (North Riding), but nothing is said of its breeding; and Mr. Chapman has known of but one nest in Wensleydale. Mr. Tinkler has not observed it in Swaledale, although "he has kept a sharp look-out for it." Mr. Goodchild, however, remarks, relative to its distribution in Swaledale, that the "Whinchat is commonest in summer? Stonechat less common." It is reported to breed near Richmond, but is not said with what frequency, but is omitted from the list of Aysgarth birds. In Ryedale (north-east) it is said to be rarely observed. I did not notice it in the neighbourhood of Whitby in the spring of 1898, but it is quite probable it might have been overlooked, as I have seen it during the breeding season at Flamborough Head. In the list of Flamborough birds, revised by the late Mr. Cordeaux, it is stated to be "resident, but very local." Mr. S. L. Mosley, of Huddersfield, writes me that it "used to be fairly common at Flamborough Head"; but Mr. Oxley Grabham, who resides in the north-east district, remarks, in the 'Yorkshire Weekly Post,' Oct. 10th, 1900, that it is "very local and sparsely distributed" in Yorkshire; so, if it were once fairly common at Flamborough Head, it would appear to be dying out there. The Stonechat is mentioned in the list of birds given by the Rev. E. M. Cole, M.A., for the vale of York, in the excursion circular of the Yorkshire Nat. Union; but, again, nothing is said whether as a breeding species or on migration. Mr. Boyes, of Beverley,

in a letter recently, informs me that "it is fast dying out here. It was never plentiful, always local and scarce, and found in but one or two localities as a breeding species."

In South Yorkshire Mr. Dixon states that it breeds, but does not say whether commonly or but occasionally, in the Rivelin Valley; and the late Mr. Lister includes it in his list of spring migrants. It is certainly rare now in South-west Yorkshire. Mr. S. L. Moseley recently informed me that he had never known of its occurrence in the Huddersfield district but twice; and it is exceptionally rare about Hebden Bridge. There is no doubt but that it occasionally breeds in the Wakefield district, as mentioned by the late Mr. Talbot; and the same remark applies to the Leeds district, though it would appear to breed less occasionally as the north-west fells are approached.

After reviewing all the information to hand regarding the distribution of the Stonechat in Yorkshire, it cannot be said with exactitude to be common in any district, and, contrary to what one might expect, as it was formerly thought to be more of a sub-alpine species, it is more common in the extreme east than in the west, more especially the north-west fells, where it appears to have almost died out as a nesting species, occurring occasionally on migration, but chiefly in spring; and it would be interesting to ascertain whither these are bound, and by what migration route they arrive. So far as my experience goes, this species, other conditions being similar, prefers the coast to the inland districts. Of course these notes are not given with any pretensions to completeness or finality, but as a small contribution to a subject which is much shrouded in mystery; and it is to be hoped they will elicit further information from naturalists in all parts of the county. It might be stated here that the observations of ornithologists would possess a higher value if they would state with clearness whether, in including the Stonechat in any local lists, it was to be regarded as a breeding species, and with what frequency, or merely on migration.

NOTES AND QUERIES.

MAMMALIA.

The Building of a Dormouse's Nest.—A Dormouse (*Muscardinus avellanarius*) that I have had in captivity since the middle of September has built three successive nests. The whole process was so unexpected that an account of it may not be without interest to readers of 'The Zoologist.' The Dormouse was kept in a large box with a glass front, rendering observation easy. The bottom was covered with a thick layer of sand, surmounted by a quantity of fine hay. At first the little animal used to sleep curled up in one corner, where its weight formed a slight hollow in the hay. Soon afterwards it took to burrowing in the hay till it was invisible. The hay and sand used to be changed every few days. It preferred acorns to any other food, and drank a good deal of water, sitting on the edge of the glass, and stooping down till the lips were immersed. It slept all day as a rule, but often woke up for a short time in the afternoon, retiring to rest again till about 11 p.m. I presume it was awake most of the night, as the bulk of its food was taken then. About Nov. 20th the Dormouse ceased coming out in the afternoon; so, supposing it was about to enter on its winter sleep, I stopped changing the hay. A few days later I noticed the hay in one spot was raised into a little dome, where the Mouse was ensconced. This dome increased in size daily, and then a small hole appeared in one side, through which the Mouse could be seen curled up inside. Further, it could be seen that the hay was no longer a mere mass of stalks roughly thrown together, but the stalks in the interior were nearly arranged in concentric curves. In short, the Mouse had made a hollow spherical nest in the middle of the hay. I never saw it at work, however, till one evening about 9 o'clock; I heard it moving, and watched what happened. It was inside the nest, all but its head and fore-paws. These last were working with an energy quite surprising in so indolent an animal, trying to scratch towards it a hay-stalk in front of the nest. Finally it seized it by the middle, and dragged it backwards into the nest. Now, rolling itself into a ball, the Mouse began to revolve inside the nest. Over and over it went, time after time, by its movements smoothing out the hay, at the same time rounding the interior of the nest, and pushing it outwards. There seems no reason to suppose that this Dormouse adopted a different plan of nest-building in captivity from that which it used in

a natural state. The nests, of which I have examined scores around Shrewsbury, are constructed of long grass, with moss, &c., added for warmth. We know that birds build their nests by laying a foundation first, next raising the sides, and finally putting in the lining. It would seem that the Dormouse acts quite differently. Many birds weave their materials skilfully together, using the beak like a bodkin. The Dormouse has no such tool, and does not weave the grass at all. Apparently he puts together a bundle of grass-stalks, and then dives into the middle, taking in other pieces, one by one, always working from the centre, rounding the nest by revolving inside it, and enlarging it by pressing outwards. This first nest was removed to clean the box. A fresh supply of hay was put in; the Dormouse in two nights constructed a second nest as perfect as the first. Afterwards a third was made under similar circumstances, and there he still resides. I never saw him at work on these, as he made them entirely by night.—H. E. FORREST (Shrewsbury).

AVES.

Some Appearances of the Ring-Ouzel at St. Leonards-on-Sea.—I have noticed Ring-Ouzels (*Turdus torquatus*) here during the spring migrations of 1899 and 1900. I saw the first on April 6th, 1899, about midday, near Felsham farm; and on April 15th, 1900, about 7 a.m., I saw another; on Oct. 19th, 1900, I shot a fine specimen (male), and on the 26th I saw three more, all within the same fields. It seems to occur regularly on the autumn migration, about the middle of October, and I should say, judging from my own observations, during the spring migration also.—MICHAEL JOHN NICOLL (10, Charles Road, St. Leonards).

Yellow Wagtails wintering in the Isle of Man.—While on a visit to the Isle of Man, I observed, on Dec. 8th, two Yellow Wagtails (*Motacilla campestris*) on the cultivated land under Maughold Head, by Ramsey. I have never heard of the bird wintering in the British Isles before, but this interesting instance is no doubt due to the extremely mild winters nearly always experienced in the island.—C. H. B. GRANT (Putney).

Notes on the House-Martin and Sand-Martin.—A pair of House-Martins (*Chelidon urbica*) had three young in the nest at Lower Hagley so exceptionally late as Oct. 16th, 1900, after which date no House-Martins were observed in this neighbourhood, the last Swallows being seen on 9th inst. On Aug. 4th a white House-Martin, probably an albino and a young bird, was in company with others circling around in Hagley Park. A small colony of some six or eight pairs of Sand-Martins (*Cotile riparia*) have utilised for their nesting accommodation a wall of red sandstone which is built alongside the cutting of the road at Belbroughton.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Nesting of the Jackdaw.—During the past year two unusual instances of the nesting of *Corvus monedula* came under my observation. In Hagley Park by far the commonest nesting species are Jackdaws, and their numbers might be estimated from two to three hundred pairs, the old trees, the church, and various other buildings affording the principal nesting accommodation. Two pairs, however, constructed their nests in a small plantation of young spruce-firs, and on May 8th both contained eggs. The nests, as is usual elsewhere, were constructed in a very slipshod manner, and seemingly very insecure: no attempt had been made to form a dome or covering over the nest, the hollow in which the eggs rested being quite shallow. In the other instance, which was during April, a pair were building their nest within a cowled chimney of a house close to the park, the entrance to which always varied according to the direction of the wind.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Nightjar hawking May-flies.—When in company with my friend Mr. H. E. Forrest, on May 19th last, watching the hundreds of Noctule Bats and Swifts hawking the May-flies over the River Severn above Bewdley, two Nightjars (*Caprimulgus europaeus*) eventually joined the company, and seemed to be equally adept in taking these insects: they remained there for a considerable time—in fact, until too dark for us to make further observations.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Shag in West Suffolk.—An immature Shag (*Phalacrocorax carbo*) was shot on the roof of a house about four miles north of Bury St. Edmunds on December 17th last, which Mr. Travis, the Bury taxidermist, showed me in the flesh a day or two later. The Shag is a far less common bird in East Anglia than the Cormorant, and perhaps not more than half a dozen specimens have been obtained in Suffolk.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Little Egret in Yorkshire.—Seeing the editorial note in 'The Zoologist' on the proposed continuation of the publication of the Birds of Yorkshire, I am forcibly reminded of a promise I have times and again made myself that I would publish a record of an unrecorded example of the graceful little white *Ardea garzetta*. As near as I can ascertain, it is about twenty-five years ago since the Chester Society of Natural Science acquired an almost complete collection of British Birds, which, judging from the style of mounting and certain records, had been made during the twenties and thirties of the last century. The whole collection was contained in ordinary box-cases, and almost all the larger sheets of glass used in glazing them were of the old "crown" type, bearing the characteristic nodules. Until the year 1886 this collection was stored in the Society's Rooms in Lower Bridge Street, when it was removed to this Museum. I then found

that the majority of the specimens had been so badly attacked by moths and mould that it was desirable to have the greater part of them destroyed. Among the number of those preserved was a very fair specimen of *Ardea garzetta*, and pasted on the back of the case which contained it was a label, turned yellow by age, bearing the following inscription :—" Egret. Male. Shot March, 1826, near Paul Humber-side, Yorkshire." All this is quite clear, but there is no trace of initials or name of the owner or collector. The record is, however, intact and indisputable. It only remains for me to add my apology for having kept ornithologists so long in ignorance of such an interesting fact. Besides the foregoing, there were also the following species, bearing labels in the same handwriting :—

Machetes pugnax, Linn.—"Ruff . . . Yorkshire," . . . is all that I can make out. These are two specimens of each sex in breeding plumage. One of the males has a dark purplish ruff finely vermiculated with buff-white; the other is cream-coloured, sparingly marked with isolated blackish vermiculations.

Himantopus candidus, Bon.—Labelled "Long-legged Plover Linconshire." . . . All the rest is illegible.

Milvus ictinus, Sav.—"Kite. Female. Caught in a trap, June, 1824, Eglinton Wood, near Doncaster."

Perhaps it may be well to add that the first named species has been remounted, but before I did this I made a photograph of the specimen as it was originally stuffed.—ROBT. NEWSTEAD (Grosvenor Museum, Chester).

Bittern in Oxfordshire.—A specimen of the Bittern (*Botaurus stellaris*) was brought to me for identification on Jan. 26th, having been shot on that date near Ridge's Weir, on the Thames, by a gamekeeper in the employ of a local gentleman. Though the bird was shot on the Oxfordshire side of the stream, the ornithologists of Berkshire would, I should imagine, be perfectly justified in claiming it as well, seeing that the two counties are there merely divided by the Thames. One of the best authorities on the Birds of Oxfordshire informs me that the Bittern must now be regarded as a rare winter visitor to Oxfordshire. Last year he heard of four specimens having occurred in the county. The year 1900 was, he states, remarkable all over the kingdom for the number of Bitterns which were either shot or seen.—W. H. WARNER (Fyfield, near Abingdon).

The Nesting Habits of Moor-hens.—I have been much interested in the article on Moor-hens by your contributor, Mr. Oliver G. Pike (*ante*, p. 17); and, since he asks if this habit of building nests as landing stages for the young has been observed by other correspondents, I may mention that I have frequently observed it, and that a note to that effect was published in the 'Avicultural Magazine' for January, 1898 (vol. iv. p. 52).

There is also an interesting article on the habits of Moor-hens from the pen of Mr. C. L. Hett in the same journal for December, 1897 (vol. iv. p. 27), in which Mr. Hett expresses the opinion that some of these nests are built by the young themselves.—J. LEWIS BONHOTE (Ditton Hall, Fen Ditton, Cambridge).

Red-necked Phalarope in Lincolnshire.—Though perhaps not so rare on the autumn passage as is generally supposed, the occurrence of the Red-necked Phalarope (*Phalaropus hyperboreus*) seems worth placing on record. During the last week of October, 1900, one of these birds was sent to me by a local Plover-catcher which had just been killed at North Cotes. The same man told me that he had caught a similar bird a few days previously, but had allowed it to spoil.—G. H. CATON HAIGH (Aber-iâ, Penrhyn-deudraeth, Merionethshire, North Wales).

The Names of British Birds.—Mr. H. A. Macpherson, in his note (Zool. 1900, p. 558), joins issue with me on the derivation of Fulmar, and contends that the word has nothing to do with Foumart or Foulmart. In this, I venture to suggest, he is not quite correct. The English used the word originally (in the form of *Foul Mart*) to designate the Polecat, on account of the strong smell for which that mammal is notorious. The word was then borrowed by the Gaels of Scotland, and in the form of *Fulmair* was, for the same reason, bestowed on the Petrel in question. The modern English, in their turn, adopted the Gaelic name, by which the bird is now universally recognised. I think Mr. Macpherson will find, on reference to any trustworthy authority, that I am correct in stating that the word is purely English, and it is through that language that it finds a place in the Gaelic vocabulary. Still, if he can trace the word back to the "purely Gaelic sources" he mentions, I am willing to admit myself in error. *A propos* of Mr. Aplin's query as to Pie having some reference to the pied plumage of the Magpie and other birds, a question of no little interest is raised. It can, however, be easily understood that Pie, though really imitative of the bird's cry, came to be significant of black and white plumage owing to its association with the Magpie. If, on the other hand, Mr. Aplin contends that *Picus* (with which Pie is akin) has some connection with *pictus*, "painted," his suggestion is probably the correct one. Mr. Aplin also calls attention to the *ch* in Pochard being hard, and cites Poker as another name for the bird. This very fact, instead of making the connection between Pochard and Poacher slighter, in reality considerably strengthens it, since *poach* has an intimate relation to the word *poke* (to thrust). As to the *guille* in Guillemot, there is no manner of doubt that it is the same word as *gull*. The French had simply adapted the Breton (Celtic) form *gvelan*, and had added, by way of explanation, their

own word of similar meaning, viz. *mouette* (or *mot*), which is connected with *mew*—a word still found in the Scotch name for a gull, namely, *maw*. In short, Guillemot is a Celtic-Teutonic compound, in which one word explains the other. Finally, Nuthatch does not MEAN, though it may imply, Nut-cracker, but is simply another form of Nut-hacker, *i. e.* Nut-hewer. The bird may HACK at a nut, which may or may not be CRACKED by the blow.—
A. H. MEIKLEJOHN (Highworth, Ashford, Kent).

MOLLUSCA.

Molluscs eaten by Wood-Pigeons.—Referring to the notes on this subject (Zool. 1900, p. 484), not only is this usual in wild birds, but also in fancy Pigeons occupying our aviaries; my brother kept a number of the last, which he was in the habit of letting out in early mornings for exercise. After such excursions they fed their young as soon as they returned, and I have frequently cleaned away from round their beaks (*i. e.* of the squabs) remains of Snails and Slugs; these young were always stronger than the young of those who never had their liberty, and consequently had no opportunity of obtaining such food; though, when I have supplied a handful of the large garden shelled Snails, they have been eagerly eaten, smashing the shells as do Thrushes. My outdoor experience teaches me that Wood-Pigeons and others not only partake of, but search for (as eagerly as Thrushes, &c.), such molluscs as are to be found in our fields and inland waters, to which my experience has been confined.—WESLEY T. PAGE (6, Rylett Crescent, Shepherd's Bush, W.).

ORGANIC EVOLUTION.

Non-Protective Colouration in the Variable Hare.—When reading Mr. Marshall's paper on "Conscious Protective Resemblance" (Zool. 1900, p. 536), some remarks of his recalled to my mind a very striking example of how an instinct, born of a protective colouration, may defeat its own purpose under a change of environment. On p. 542 Mr. Marshall quotes Romanes' remarks about the melanic variety of the Rabbit crouching as steadily as the normally coloured type, and rendering itself "the most conspicuous object in the landscape." In March, 1899, Mr. C. Oldham and I observed a number of Variable Hares (*Lepus timidus*, Linn.) on the moors in Longdendale, Cheshire. The weather was mild, and we only saw a single patch of snow, but the Hares were still in their white winter pelage, though most of them had already patches of brown about the head and flanks. These animals are the descendants of some Perthshire Hares which were turned down near Greenfield, Yorkshire, about twenty years ago, and which have increased in numbers, and have spread over a large tract of moorland in Yorkshire, Cheshire, and Derbyshire. In the North of Scotland the

moors are snow-covered much later than is usually the case in Cheshire, and the white dress would be a distinct advantage to the Hares, but on the milder bare slopes of these English moors it only tends to make them conspicuous. When the Longendale moors were snow-covered we have crossed them without seeing a single Hare, though their tracks were visible in the snow in every direction. Again, in summer the grey-brown pelage makes them almost invisible, and we very seldom see any. This was not the case this March, for the white spots on the hillsides were noticeable from a great distance against the dark background of brown bracken, ling, and millstone-grit rock, and they certainly were "the most conspicuous objects in the landscape." The Hares were squatting at the entrance to holes among the stones, or under the shelter of overhauling rocks, and, when we approached, remained perfectly still, evidently instinctively trusting to their protective colouration. They crouched when we got near, laying their ears back, and allowing us to approach within a few yards. One did not move until we were only six yards away, and another let us get within ten yards before it bolted. We stood within this short distance, watching their eyes following our movements, and we could see the wind blowing the loose hair from their backs. The forms where they had been sitting were full of shed hair.

If it were possible for the Hares to reason,* it must be evident that they would be conscious that their colour was not in harmony with their surroundings; but it seems perfectly plain that they had been taught by heredity that their safety depended upon their remaining still, and they had no idea of any change of conditions.† It might be argued that in twenty years the survival of the habit of remaining still for protection would have been so

* R. Kearton ("Nature and a Camera," p. 176) narrates a practice of the Hare which he well describes as "like a reasoned action deliberately executed to mislead prowling enemies that track them by the scent left in their footprints."—ED.

† A Woodcock has been observed to reason under such conditions. Mr. F. M. Chapman, of the American Museum of Natural History, New York, in a lecture on 'Birds in Nature,' remarks:—"That the Woodcock appreciates the value of its costume of brown and black is, he thinks, fairly proved by the experience of a friend of his. Early one spring morning he found a nest of this species occupied by one of the birds. Approaching the bird cautiously, he managed to stroke its plumage without its taking fright, so great was its faith in its protective colours. He also succeeded in taking a photograph of the bird, placing the camera a few feet from it. Focussing was accomplished with difficulty, and only by using the eye of the bird as a focal point. The picture is a veritable puzzle. The bird is invisible to most eyes, though plain enough when once distinguished. While the bird was sitting a slight snow fell. The brown leaves which before had aided its concealment were now covered with a white mantle, and the bird became a conspicuous dark object against this snowy background. It now had no confidence whatever in its colouring, and took wing as soon as a person appeared on its horizon."—ED.

detrimental to the Hares that either they would have been exterminated by their natural enemies, or that natural selection, through the instrumentality of their enemies, would have caused them to adopt the more protective summer dress much earlier. But it must be taken into consideration that these Grouse-moors are most strictly preserved, and that all the large pre-daceous birds and carnivorous animals are destroyed whenever they appear. Foxes are trapped in large numbers, and there are hardly any large Hawks. Thus the action of natural selection in regard to colouration is practically annulled, and there is nothing to influence any change. This is a clear case of what Mr. Marshall speaks about on p. 542, an "observation of the demeanour of protectively coloured animals, which find themselves, by natural accident or necessity, in an environment to which their colour is quite unsuited"; and the animals have not altered their habits, but adopted "their usual attitudes of concealment," and it appears to be an unmistakable example of "unreasoning instinct."

It was interesting to note how the Hares escaped when we got so close that they came to the conclusion that they were observed. Out of nine that we bolted, two ran into crevices in the rocks, two ran along the side of the hill, and five went straight uphill at a great pace. The visibility of the Hares may be understood from a remark in a letter from the late Col. Crompton Lees. He tells us that on his moors at Greenfield, Yorkshire, in March, 1893, his keeper from one spot on the hills counted over fifty Hares within range of his field-glass at one time.—T. A. COWARD (Bowdon, Cheshire).

NOTICES OF NEW BOOKS.

British Flies. Vol. VIII. By G. H. VERRALL.
Gurney & Jackson.

THIS is the first of fourteen volumes on the British Diptera, in which Mr. Verrall proposes to describe and illustrate a very much neglected order of our insular insects. In writing his first volume, he has already helped to fill a gap which existed on the shelves containing the publications on the Natural History of Britain.

This volume commences the series devoted to the Diptera Cyclorrhapha, and describes the Platypezidæ, Pipunculidæ, and Syrphidæ. It is not a compilation, and for the very best reasons: firstly, the antecedent publication is too small for the purpose; and secondly, it is the result and condensation of some thirty years' collecting and observation. It mostly follows the best traditions of monographic productions, although on many points Mr. Verrall is a law unto himself. Thus the synonymy of the genera and species has been deferred to a catalogue at the end of the volume, though the author's synonymous criticisms are appended to his descriptions of the species. We are, perhaps, old-fashioned, but we like this course as little as the sometime practice of discarding footnotes, and placing such references in the same position as Mr. Verrall's synonymous records are to be found.

The author's descriptions of the species are ample, concise, and clear, and if his views recently expressed in a presidential address—that all insufficient descriptions should be discarded—are to be followed, then, as a logical correlation, the name of Verrall should in justice be applied as the parent name to many of these species. But we do not think this is likely to take place; all reforms are only partial; you may shift, but you cannot abolish, the vested interest. In nomenclature there is no

finality. Its vicissitudes represent the phases of current opinion. We may change names to-day, and posterity will probably religiously restore them. Even the binomial nomenclature of Linnaeus only exists because we cannot at present imagine a better procedure—and this is the highest praise that can be given to any system or proposition.

This volume, however, represents much more than a discussion on nomenclature or a taxonomical digression. It is the descriptive history to date of a portion of the two-winged flies (Diptera) found in Britain, the general knowledge of which, it may be said, will date from the time of this publication. It is a work which is written in a calm, judicial spirit, and leaves the problems of evolution alone; it describes the insects as they are, and does not discuss the question why they should be so. Perhaps we need not regret this course, for to-day there seem more writers on the last subject than there are who can describe present appearances. A portrait of Meigen is supplied as a frontispiece to this welcome addition to the publications on the Zoology of our own country.

The Mammals of South Africa. By W. L. SCLATER, M.A., F.Z.S.
Vol. I. Primates, Carnivora, and Ungulata. R. H. Porter.

THIS is the second volume of the series devoted to the Fauna of South Africa; the first, relating to Birds, was noticed in the 'Zoologist' for 1900.

The mammals of this region, especially those belonging to the order Ungulata, are sufficient to inspire the pen of any naturalist; no area ever possessed more rich and wonderful herds of game than those which once roamed over its plains, now alas! sadly diminished in numbers, with its erstwhile Blaauwok and Quagga reported as absolutely extinct. We have only to read the narratives of the old travellers—Mr. Selater has prefaced his volume with an excellent bibliography—and to compare their accounts of mammalian life with its diminished aspect to-day, to realise how man is after all the most destructive animal on the planet. But in South Africa it is not the sportsman so much as the trader who hath wrought this havoc, though it is often difficult to separate the one from the other.

The Primates occupy but a small part of the work, as they are very few in number, for although, as the author remarks, "this order comprises Man, the Monkeys, and the Lemurs," we have not yet reached a comprehensive treatment of the order in one publication, and Man still has an anthropological treatment all alone, as befits the "lord of the creation."

The Carnivora, by the presence of the African Lion, becomes an order of importance in this region. The animal is not now found south of the Orange River, but is still a denizen of many parts of the wooded Transvaal; and the writer of this notice has within the last decade seen many a skin brought in by the Boers for sale on the Pretoria market. It is, however, in the descriptions and details of the *Viverridæ* that this book will prove a perfect boon to all those who take an interest in the animal life of South Africa, a class likely to be largely augmented in numbers in the very near future. The Aard Wolf (*Proteles cristatus*), which enjoys an insectivorous diet, is now reported to have acquired a habit, like the Baboon, of attacking kids and lambs.

When we come to the Ungulata, we approach an almost vanishing race. The Blaaubok and Quagga are gone, and to anyone conversant with the number of Zebra hides which can be purchased in the season at Lourenço Marques, it is apparent that that animal must be making a struggle for continued existence in South-east Africa. The present writer, a few years ago, could have purchased some eight hundred game hides at Delagoa Bay, the greater portion of which were Zebras', and all killed in one season. This quantity was for sale by one firm alone! It is painful in reading the book to meet with so many fine animals now only represented by preserved and localised individuals. The Black Wildebeest (*Connochaetes gnu*) "is now practically extinct in a true feral condition"; the Eland (*Taurotragus oryx*), which was "formerly found all over South Africa, including the Colony," is still found a few at a time in some favourite localities; "elsewhere they have been nearly exterminated." But it is needless to dwell on a too well-known fact.

This volume should form part of the equipment of any proposed emigrant to South Africa who is prepared to look at nature other than exhibited by a metalliferous reef. Its value is felt by

those of us who were once there, but without a publication like the present, which would have supplied a long-felt want. We trust that Mr. Sclater will soon produce his second volume.

The Crocodilians, Lizards, and Snakes of North America. By EDWARD DRINKER COPE, A.M., Ph.D. Ann. Rept. Smithsonian Institution, 1898 (1900). Washington: Government Printing Office.

THE principal portion of the pages of this last report—just received—is occupied by a posthumous communication by the late Dr. Cope, which extends over one thousand pages, is fully illustrated, and is a worthy legacy by a great palaeontologist and evolutionist now no longer with us. As is well known, Dr. Cope held his own views on evolution, and was neither swayed by modern theories, nor influenced by opinions which had obtained a present currency but not necessarily the assurance of a future canonization. It is not our province to advocate his evolutionary views; it is, however, our duty to more or less express them. In this treatise they are not too pronounced, and may be found in his preface. In these days, when it is the vogue to express generic resemblances as always due to the phenomenon of mimicry, it is perhaps well to remember that the explanation is at least of not universal acceptance. Thus Dr. Cope writes:—"I long since pointed out that generic characters may, and in fact generally do, arise in the process of evolution quite independently of the specific, so that certain species of different genera resemble each other in the so-called "natural," that is, specific characters, more than they do other species of their own genus. . . . It is not, then, remarkable that sometimes one or more species of two or more genera should parallel each other."

It would, however, be a misrepresentation to lead a reader or student to suppose that this publication is of a speculative character. It is, on the contrary, a very fully descriptive monograph on the Crocodilians, Lizards, and Snakes of North America, in which the taxonomic features far exceed the bionomic details, and absolutely supplant theoretic speculations. It is, however, rare to find any zoological publication without some information that supports or minimises some evolutionary conceptions.

This contribution makes the last Smithsonian Report a notable publication.

Lord Lilford: a Memoir, by his Sister. Smith, Elder & Co.

THIS is not to be considered a full biography, especially from the ornithological standpoint; it is the worthy tribute of a sister to the memory of a naturalist brother, and "to keep such a memory alive in the family to which he belonged." Lord Lilford must have had an unique and lovable personality, which impressed, amongst others, the late Bishop of London, who wrote an introduction to the volume, and who bore this witness:—"To me he was a man of remarkable attainments and singular charm, a man whom to know was a life-long possession." The limitations and compensations of his existence are fully set forth, and yet we rise from the perusal of the volume with the opinion that his life was, on the whole, a happy one. There were shadows, but not sufficient to quench a sunlight that pervades the letters which occupy the larger portion of the book.

There can be no doubt, as we read these pages, that Lord Lilford was not only an ornithologist at heart, but possessed a desire to do all in his power to further the interests of the science. His "Coloured Figures of the Birds of the British Islands" is a publication which will prove a permanent monument to his memory, whilst his collection of living birds must have afforded a zoological lesson. The accident of high social position, with its wealth and leisure, he abundantly proved could be made a dominant factor in the study of nature, and we feel that the only discordant chord in the whole of a most charming and genial narrative is a quotation from the letter of the rector of the local living, who, speaking of the universal grief at the death of Lord Lilford, remarks, "Even the Radical papers have kindly notices." Why not? Surely politics are outside Zoology, and are largely the creation of environment. We neither particularly want to see Radical Peers nor Tory village artisans, the sense of proportion is a charm in life. But the subject of this memoir is outside these narrow restrictions; judged as an ornithologist by naturalists, or by the "abiding power of character," as expressed by the late Bishop, he strikes a deeper sympathy than can be expressed in the terms of a parliamentary jargon.

